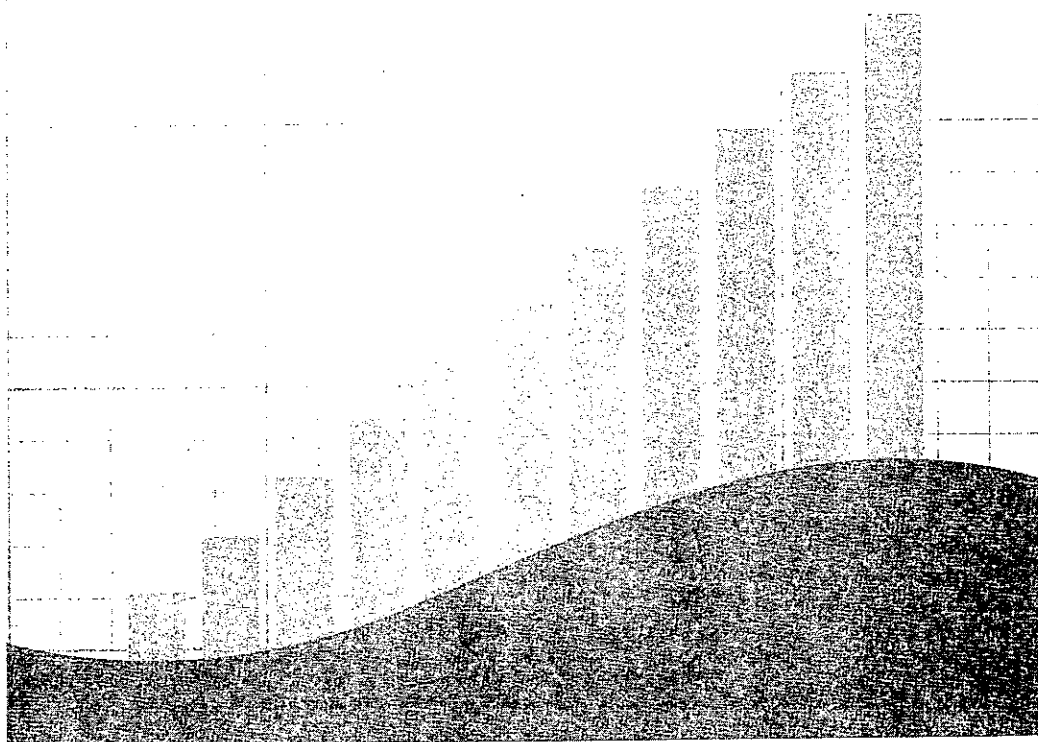


MACROECONOMICS

National Income and Price Determination

Unit 3





- Aggregate demand (AD) and aggregate supply (AS) curves look and operate much like the market supply and demand curves used in microeconomics. However, *aggregate demand* and *aggregate supply* curves depict somewhat different concepts, and they change for different reasons. AD and AS curves are used to illustrate changes in real output and the price level of an economy.
 - The downward slope of the AD curve is explained by the *interest rate effect*, the *wealth effect*, and the *net export effect*. The wealth effect is also called the real-balance effect.
 - The upward slope of the short-run aggregate supply curve (SRAS) is explained by fixed input costs (e.g., sticky wages). The long-run aggregate supply (LRAS) curve is vertical at the full-employment level of output.
 - The *marginal propensity to consume* (MPC) is the additional consumption spending from an additional dollar of income. The *marginal propensity to save* (MPS) is the additional savings from an additional dollar of income.
- $$MPC + MPS = 1.$$
- The spending *multiplier* shows the relationship between changes in spending and the maximum resulting changes in real gross domestic product (GDP). The simple spending multiplier is given as:

$$\text{Spending multiplier} = \frac{1}{1 - MPC} = \frac{1}{MPS}$$

- Shifts in AD can change the level of output, the price level or both. The determinants of AD include consumer spending, investment spending, government spending, net export spending, and government policies.
- Shifts in SRAS can also change the level of output and the price level. The determinants of SRAS include changes in input prices, productivity, the legal institutional environment, and the quantity of available resources.
- There are two types of inflation: *demand-pull inflation* and *cost-push inflation*. When high unemployment occurs along with high inflation, it is known as stagflation.
- The LRAS curve is vertical at the full-employment level of output.
- In the short run, equilibrium levels of GDP can occur at less than, greater than, or at the full-employment level of GDP. Long-run equilibrium can occur only at full employment.

An Introduction to Aggregate Demand

Why Is the Aggregate Demand Curve Downward Sloping?

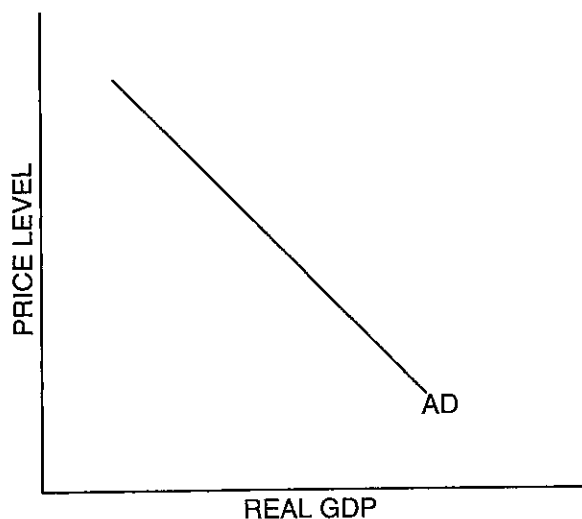
Aggregate demand (AD) shows the relationship between real gross domestic product (GDP) and the price level in the economy. As shown in Figure 3-1.1, the AD curve has a negative slope, showing that as the price level increases, real GDP decreases, and as the price level decreases, real GDP increases. The negative relationship between the price level and real GDP is explained by three different things that happen when the price level changes in the economy. When the price level changes, it affects consumers' purchasing power, interest rates paid by consumers and businesses, and the relative prices of domestic goods and services compared to imported goods and services. The effect of a change in the price level on consumers' purchasing power is called the *wealth effect*. The effect of a change in the price level on interest rates (and therefore interest-sensitive spending by consumers on things like houses and cars and investment spending by businesses) is called the *interest rate effect*. The effect of a change in the price level on imports and exports is called the *net export effect*. These three effects explain why the AD curve has a negative slope.

- ! **Student Alert:** Make sure that when you label an AS/AD graph you use price level and real GDP. Don't use P and Q—those are MICRO labels!



Figure 3-1.1

Aggregate Demand Curve



Determine whether each change listed in Table 3-1.1 will cause an increase, decrease, or no change in AD.

2. In column 1, list which component of AD is affected: C, I, G, or Xn.
3. In column 2, draw an up arrow if the change will cause an increase in AD, a down arrow if it will cause a decrease in AD, and write NC if it will not change AD.
4. In column 3, write the number of the AD curve after the change (always start with AD).



Table 3-1.1

Changes in Aggregate Demand

Change	1. Component of AD	2. Direction of AD change	3. Resulting AD curve
(A) Consumers respond to high levels of debt by reducing their purchases of durable goods.			
(B) Reduced business confidence leads to a reduction in investment spending.			
(C) Government spending increases with no increase in taxes.			
(D) Survey shows consumer confidence jumps.			
(E) Stock market collapses; investors lose billions.			
(F) Productivity rises for fourth straight year.			
(G) New tariffs on imported goods lead to a trade war that reduces exports by more than it reduces imports.			

1. Explain how each of the following effects leads to a decrease in real GDP when the price level rises.

(A) Interest rate effect

(B) Wealth effect or real balance effect

(C) Net export effect

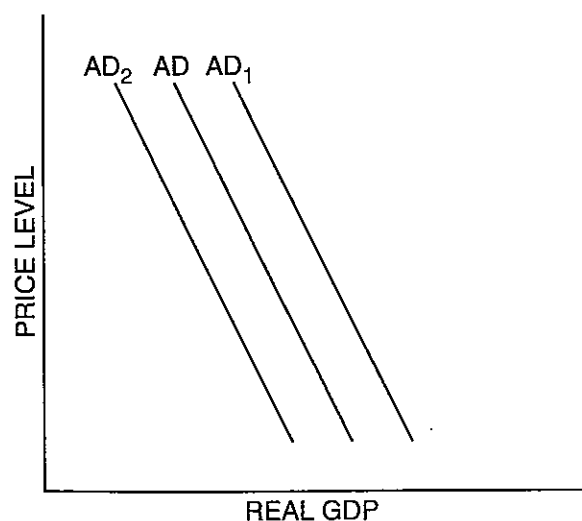
What Shifts the Aggregate Demand Curve?

AD is made up of spending by households, businesses, the government, and other countries. The AD curve will shift if there is a change in any of its components: consumption (C), investment (I), government spending (G), or net exports (Xn). As shown in Figure 3-1.2, an increase in AD is shown by a rightward shift of the AD curve, e.g., from AD to AD_1 . A decrease in AD is shown by a leftward shift of the AD curve, e.g., from AD to AD_2 .



Figure 3-1.2

Shifts in Aggregate Demand



The Multiplier

An initial change in any of the components of aggregate demand (AD) will lead to further changes in the economy and an even larger final change in real gross domestic product (GDP). That is, any initial change in spending will be multiplied as it impacts the economy. The final impact of an initial change in spending can be calculated using the *spending multiplier*. The size of the final impact of an initial change in spending on real GDP is affected by the amount of additional spending that results when households receive additional income, called the *marginal propensity to consume*, or MPC. The MPC is the key to understanding the multiplier, so the first step in understanding the multiplier is to understand the MPC.

The MPC is the change in consumption divided by the change in disposable income (DI). It is a fraction of any change in DI that is spent on consumer goods (C): $MPC = \Delta C / \Delta DI$.

The *marginal propensity to save (MPS)* is the fraction saved of any change in disposable income. The MPS is equal to the change in saving divided by the change in DI: $MPS = \Delta S / \Delta DI$.

The MPC measures *changes* in consumption when income changes. The MPC is distinct from the *average propensity to consume (APC)*, which measures the average amount of the total income households spend or save.

The APC is the ratio of C to disposable income, or $APC = C / DI$.

The *average propensity to save (APS)* is the ratio of savings (S) to disposable income, or $APS = S / DI$.

1. Fill in the blanks in Table 3-2.1.



Table 3-2.1

Average Propensities to Consume and to Save

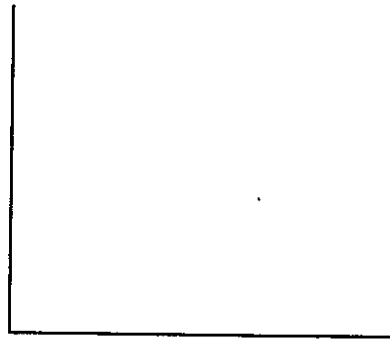
Disposable income	Consumption	Saving	APC	APS
\$0	\$2,000	-\$2,000	—	—
\$2,000	\$3,600	-\$1,600	1.8	-0.8
\$4,000	\$5,200	-\$1,200		
\$6,000	\$6,800	-\$800		
\$8,000	\$8,400	-\$400		
\$10,000	\$10,000	\$0		
\$12,000	\$11,600	\$400		

Investment Demand

Investment spending consists of spending on new buildings, machinery, plants, and equipment. Investment spending is a part of aggregate expenditures in the economy. Any increase in investment spending will necessarily increase aggregate expenditures (GDP) and AD.

Decisions about investment spending are based on a comparison of marginal cost and marginal benefit. If a firm expects a particular project to yield a greater benefit than cost, it will undertake it. An important cost associated with investment spending is the interest expense. Firms must either borrow money to engage in an investment project or use their own money. In either case, the interest rate determines the cost of the investment project. If the firm borrows money to invest, it must pay the interest rate to borrow. If the firm uses its own money, then it gives up the interest it could have earned by loaning that money to someone else. That is, the interest rate measures the opportunity cost if a firm invests with its own money.

5. Draw a graph illustrating an investment demand curve. Remember, the price paid to invest is the interest rate, so your graph should show the interest rate on the vertical axis, and the demand curve should have a slope that illustrates the relationship between the interest rate and the amount of investment a firm will undertake.



6. What factors could cause a firm to invest more or less at any given level of the interest rate? That is, what could cause the investment demand curve to shift (increase or decrease)?



Table 3-2.3

Changes in Econoland's GDP, Consumption, and Saving

Round	Income (GDP)	Consumption spending	Saving
Round 1	\$1,000	0.75 of \$1,000 = \$750.00	0.25 of \$1,000 = \$250.00
Round 2	One person's spending becoming another person's income: \$750.00	0.75 of \$750 = \$562.50	0.25 of \$750 = \$187.50
Round 3	The next person's spending becoming another person's income: \$562.50	0.75 of \$562.50 = \$421.88	0.25 of \$562.50 = \$140.62
Round 4	The next person's spending becoming another person's income: \$421.88	0.75 of \$421.88 = \$316.41	0.25 of \$421.88 = \$105.47
Rounds continue	⋮	⋮	⋮
All rounds	Final outcome for income (GDP) $1 / (1 - 0.75) \times \$1,000 = 4 \times \$1,000$ = \$4,000	Final outcome for consumption spending $0.75 \text{ of } \$4,000 = \$3,000$	Final outcome for saving $0.25 \text{ of } \$4,000 = \$1,000$

The retired economist summarizes the multiplier effect for the crowd of Econolanders. "This shows us that the factory is an investment that has a multiplied effect on our GDP. In this case, the multiplier is 4." He adds, "It appears to be magic, but it is simply that *one person's spending becomes another person's income.*" The islanders nod with agreement but also look puzzled, so the old professor asks the citizens a series of questions. How would Econolanders answer these questions?

4. Would the multiplier be larger or smaller if you saved more of your additional income?
5. What do you think would happen if all Econolanders saved all of the change in their incomes?
6. What would happen if you spent *all* of the change in your income?

The professor then points out that a new road around the island or a new bridge built by the island government over the lagoon would also have a multiplied effect on GDP. He also tells them that if the government of Econoland lowers taxes, the citizens would have more income to spend, which would cause a multiplier effect. He notes that there is another side to this. If taxes are raised, there is a multiplier effect, which decreases income and GDP by a multiple amount.

2. Fill in the blanks in Table 3-2.2.



Table 3-2.2

Marginal Propensities to Consume and to Save

Disposable income	Consumption	Saving	MPC	MPS
\$12,000	\$12,100	-\$100	—	—
\$13,000	\$13,000	\$0	0.90	0.10
\$14,000	\$13,800	\$200		
\$15,000	\$14,500	\$500		
\$16,000	\$15,100	\$900		
\$17,000	\$18,800	\$1,400		

3. Explain why the sum of MPC and MPS must always equal 1.

The Multiplier

The following example illustrates how an initial change in a component of AD results in an even larger change in real GDP (i.e., the multiplier process).

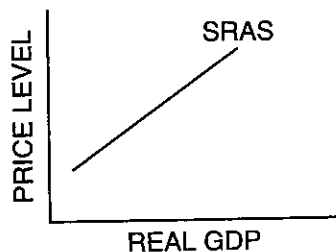
The people in Econoland live on an isolated island. One year a stranger arrives and builds a factory to make seashell charms. The factory is considered an investment on Econoland. If the MPC on the island is 75 percent, or 0.75, it means that Econoland residents consume 75 percent of any change in income and save 25 percent of any change in income. The additional spending generates additional income and eventually a multiple increase in income. This is called the *multiplier effect*. When they hear about the multiplier effect, the islanders are thrilled about the new factory because they like the idea of additional income.

The residents of Econoland want to know what would eventually happen to the levels of GDP, consumption, and saving on the island as the new spending works its way through the economy. Luckily there is a retired economist on Econoland who offers a brief statement of the multiplier. "It's simple," he says, "One person's spending becomes another person's income." The economist gives a numerical example, as shown in Table 3-2.3. "This shows the process," he says. The rounds refer to the movement of spending from resident to resident. His example stops at four rounds and the rest of the rounds are added together to cover the total effect on all Econoland's citizens.

An Introduction to Short-Run Aggregate Supply

Why Is the Short-Run Aggregate Supply Curve Upward Sloping?

The short-run aggregate supply (SRAS) curve shows the relationship between real gross domestic product (GDP) and the price level. This positive relationship exists because producers seek to maximize profits and production costs are inflexible. Since firms seek to maximize profits, change in the price level will affect the quantity that they produce. When the price level rises, but production costs stay the same, firms make more profit on each unit sold, so they increase the quantity that they produce. When the price level decreases, but production costs stay the same, firms make less profit, and they reduce the quantity that they produce. In the long run, when production costs are flexible, this relationship does not hold true. But in the short run, inflexible production costs lead to a positive relationship between the price level and real GDP and therefore an upward sloping SRAS curve.



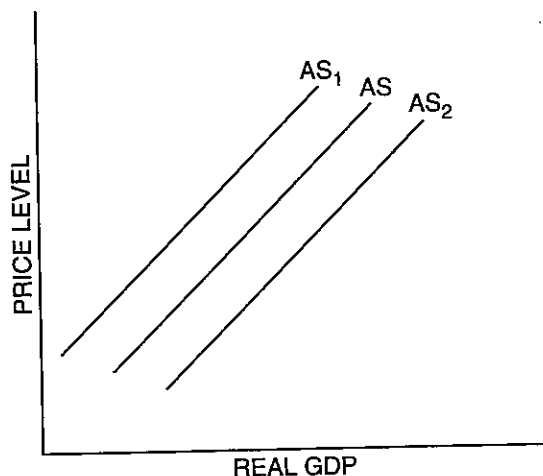
What Shifts the Short-Run Aggregate Supply Curve?

SRAS will increase if firms produce more at any given price level, and it will decrease if firms produce less at any given price level. Therefore, the SRAS curve will shift as a result of changes in input prices (e.g., nominal wages or oil prices) or productivity (e.g., technological advances), as shown in Figure 3-3.1.



Figure 3-3.1

Shifts in Short-Run Aggregate Supply



Multiplier Formulas and Terms

$$MPC = \Delta C / \Delta DI$$

$$MPS = \Delta S / \Delta DI$$

$$\text{Spending Multiplier} = 1 / (1 - MPC) \text{ or } 1 / MPS$$

How to use the spending multiplier:

$$\text{Change in GDP} = \text{change in AD component} \times \text{spending multiplier.}$$

When to use the spending multiplier:

When there is a change in a component of AD.

When the government changes taxes, it will also affect AD. If taxes are decreased, consumers (or businesses) have more disposable income and will increase spending. When the government raises taxes, households (or businesses) have less disposable income and will decrease spending. The basic multiplier effect is the same, but with two differences. First, increasing taxes decreases spending, and decreasing taxes increases spending. The effect of taxes on spending is negative, so the tax multiplier has a negative sign. Second, taxes are not a component of AD. When taxes change, consumers (or businesses) will change their spending by only part of that amount, determined by the MPC. So, for every additional dollar in disposable income, spending will only increase by $\$MPC$. Therefore, the numerator of the tax multiplier is MPC, rather than 1.

! Student Alert: Make sure to use the tax multiplier when the change affecting AD is a change in taxes!

$$\text{Tax Multiplier} = -MPC / (1 - MPC) = -MPC / MPS$$

How to use the tax multiplier:

$$\text{Change in GDP} = \text{change in taxes} \times \text{tax multiplier.}$$

When to use the tax multiplier:

When there is a change in lump-sum taxes.

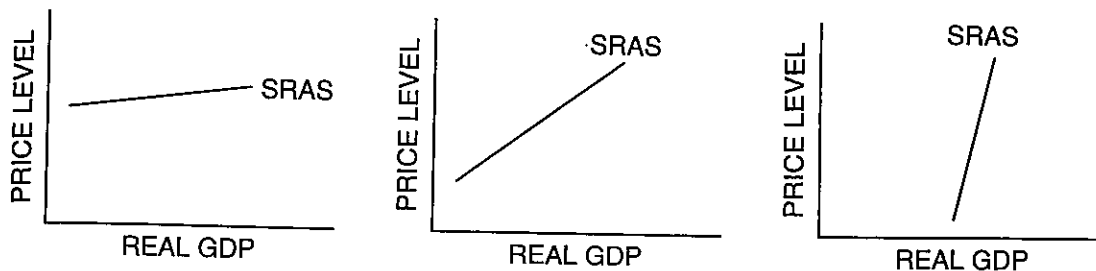
Note: Remember that the tax multiplier has a negative sign.

Quick Quiz on Multipliers

7. What is the value of the tax multiplier if the MPC is 0.80? _____
8. What is the value of the spending multiplier if the MPC is 0.67? _____
9. What is the tax multiplier if the MPS is 0.25? _____

Possible Shapes of Short-Run Aggregate Supply Curve

In general, the SRAS has a positive slope. However, in special situations, the SRAS may be very flat or very steep, as shown below.



5. What does it tell you about the relationship between the price level and real GDP if the SRAS is flat? Under what conditions would an economy have a flat SRAS curve?
6. What does it tell you about the relationship between the price level and real GDP if the SRAS is steep? Under what conditions would an economy have a steep SRAS curve?

1. Determine whether each change listed in Table 3-3.1 will cause an increase, decrease, or no change in aggregate supply (AS). Always start with AS.
2. In column 1, list which component of AS is affected: input prices or productivity.
3. In column 2, draw an up arrow if the change will cause an increase in AS, a down arrow if it will cause a decrease in AS, and write NC if it will not change AS.
4. In column 3, write the number of the AS curve after the change.



Table 3-3.1

Changes in Aggregate Supply

Change	1. Determinant of AS	2. Change in AS	3. Resulting AS curve
(A) Unions are more effective so that wage rates increase.			
(B) OPEC successfully increases oil prices.			
(C) Labor productivity increases dramatically.			
(D) Giant natural gas discovery decreases energy prices.			
(E) Computer technology brings new efficiency to industry.			
(F) Government spending increases.			
(G) Cuts in tax rates increase incentives to save and invest.			
(H) Low birth rate will decrease the labor force in the future.			
(I) Research shows that improved schools have increased the skills of American workers and managers.			

Sticky versus Flexible Wages and Prices

In macroeconomics there is both a short run and a long run. The short run is the time period in which at least one factor is fixed. For example, the price of inputs (hourly wages paid to labor and other unit resource prices) remains fixed, or sticky, in the short run. However, the price of firms' output in the product markets varies directly with the price level. Input prices remain fixed for many reasons, e.g., wage contracts, menu pricing, and delays in recognizing unanticipated inflation. The lag between changes in output prices and changes in input prices results in firms earning short-run profits when there is inflation or losses when there is deflation. The long run in macroeconomics is the period of time in which input prices adjust to changes in the overall price level.

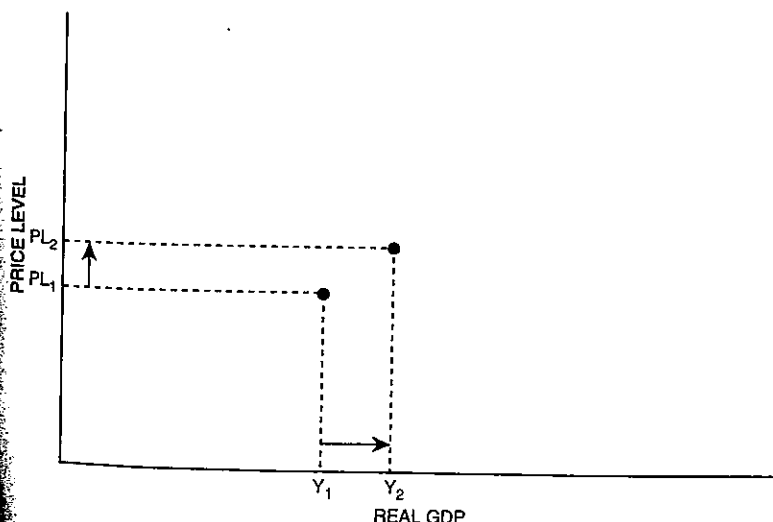
With price level increases, product market prices increase while factor market prices remain fixed. Fixed input prices and higher output prices leads to profit. This profit provides firms with an incentive to increase production. Refer to Figure 3-4.1. Notice that as price level increases from PL_1 to PL_2 that real gross domestic product (GDP) increases from Y_1 to Y_2 .

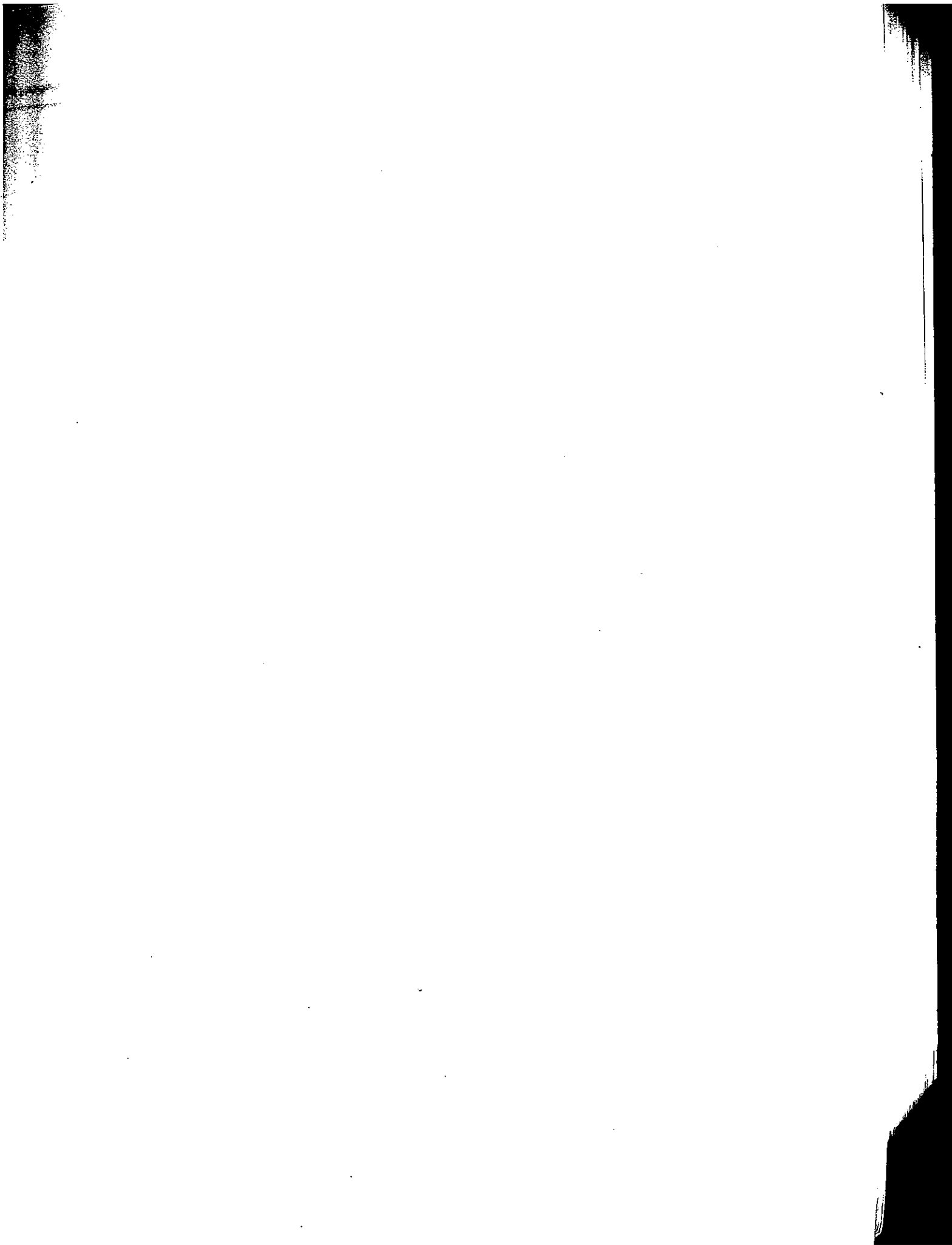
The opposite would occur if product market prices fall with a decrease in the price level. Firms experience losses when input prices remain high and output prices decrease. The losses result in a decrease in production which leads to a decrease in real GDP.

The result of firms varying their production directly with changes in the price level is an upward sloping AS curve in the short run. Hence, in the short run, the level of real GDP is directly related to the price level. Figure 3-4.2 illustrates the SRAS.

Figure 3-4.1

Price Level and Real GDP





1. Identify at least two reasons that input prices remain fixed in the short run.
2. Explain why firms' profits increase when the price level increases in the short run.
3. Would firms have an incentive to change their level of production if input prices adjusted immediately to output price changes? Why?
4. Review your answers to (2) and (3). Assume that input prices are not fixed, but that they change directly with output prices. If firms are initially producing output Y_1 as seen in the graph below, then an increase in the price level from PL_1 to PL_2 will have what effect on real GDP? Illustrate the relationship between price level and real GDP in the long run, and label it LRAS for long-run aggregate supply.

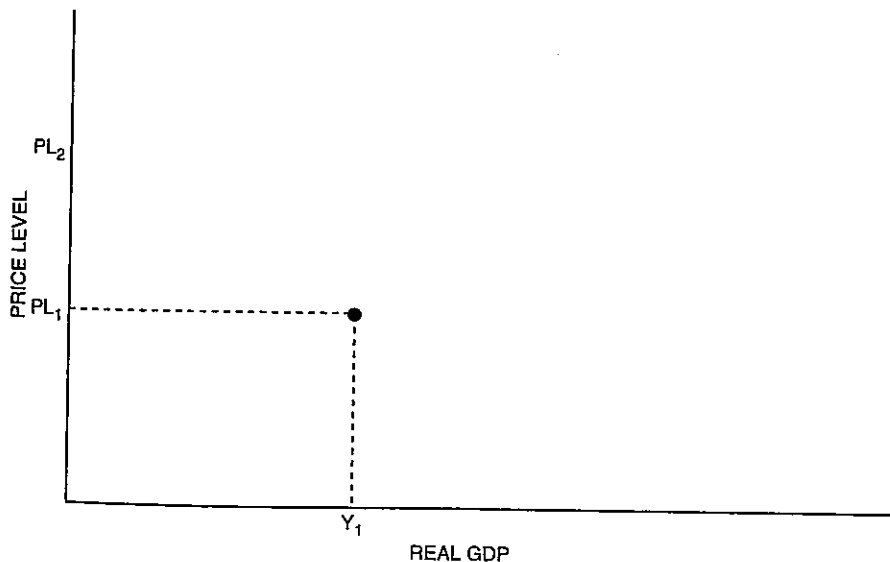
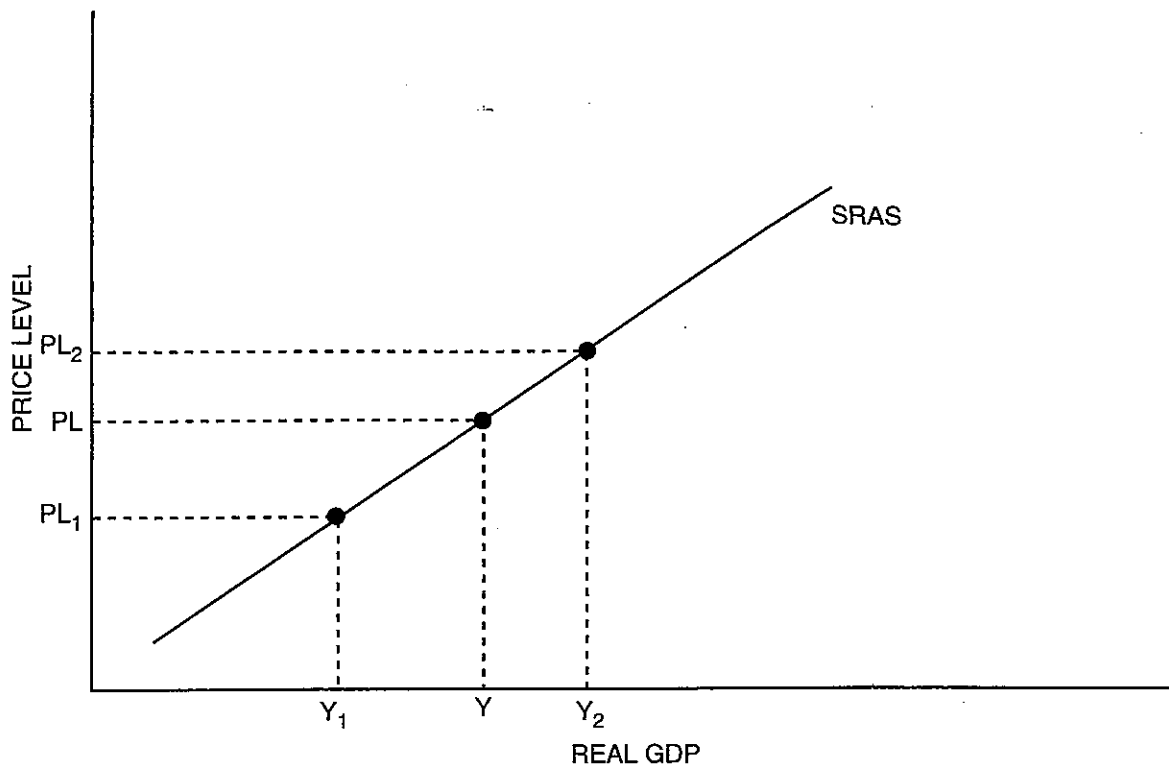




Figure 3-4.2

Short-Run Aggregate Supply Curve



Short-Run Equilibrium Price Level and Output

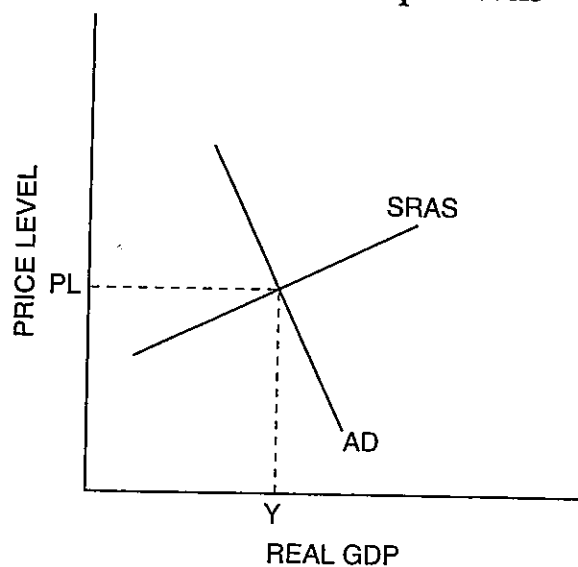
The first section of the course presented the supply and demand model as a way to determine price and quantity in individual markets. The aggregate supply (AS) and aggregate demand (AD) model uses AS and AD to determine the equilibrium price level and aggregate quantity of output (real GDP) in the economy. It is important to correctly label the AS/AD graph to distinguish it from the market supply and demand graph. As shown in Figure 3-5.1, the axes labels should clearly indicate price level (PL), real GDP (Y), AS, and AD. Equilibrium in the model is found at the intersection of AS and AD. The equilibrium PL is identified on the vertical axis and the equilibrium Y is found on the horizontal axis.

Student Alert: Make sure you label the equilibrium values on the axes rather than as a point in the middle of the graph.



Figure 3-5.1

Equilibrium Price and Output Levels



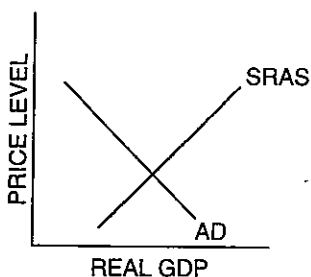
Changes in Short-Run Aggregate Supply and Aggregate Demand

The equilibrium price and quantity in the economy will change when either the short-run aggregate supply (SRAS) or the aggregate demand (AD) curve shifts. The AD curve shifts when any of the components of AD change—consumption (C), investment (I), government spending (G), exports (X), or imports (M). The aggregate supply (AS) curve shifts when there are changes in the price of inputs (e.g., nominal wages, oil prices) or changes in productivity.

Changes in the Equilibrium Price Level and Output

For each situation described below, illustrate the change on the AD and AS graph and describe the effect on the equilibrium price level and real gross domestic product (GDP) by circling the correct symbol: \uparrow for increase, \downarrow for decrease, or $—$ for unchanged

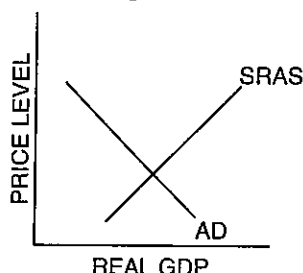
1. Business investment increases.



Price level: \uparrow \downarrow $—$

Real GDP: \uparrow \downarrow $—$

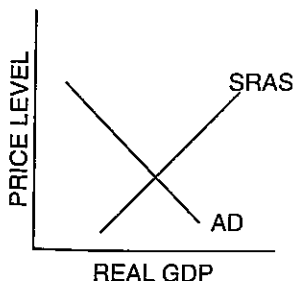
2. The government increases spending.



Price level: \uparrow \downarrow $—$

Real GDP: \uparrow \downarrow $—$

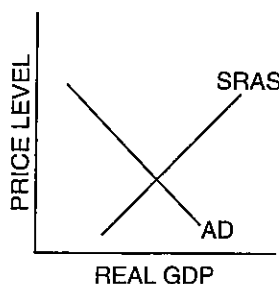
3. New oil discoveries cause large decreases in energy prices.



Price level: \uparrow \downarrow $—$

Real GDP: \uparrow \downarrow $—$

4. Consumer spending increases.



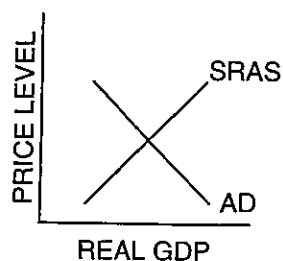
Price level: \uparrow \downarrow $—$

Real GDP: \uparrow \downarrow $—$

Summarizing Aggregate Demand and Aggregate Supply Shifts

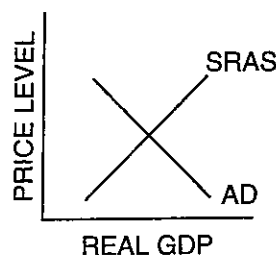
For each of the graphs below, identify the starting equilibrium PL and Y. Then show the shift given for each graph and identify the new equilibrium PL and Y. Indicate the resulting change in price level, unemployment, and real GDP by circling the up arrow for an increase or the down arrow for a decrease.

1. Increase in AD



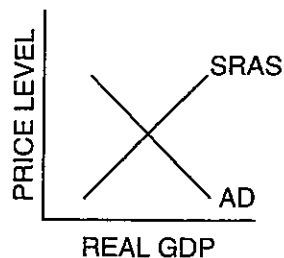
Real GDP: ↑ ↓
 Price level: ↑ ↓
 Unemployment: ↑ ↓

2. Increase in AS



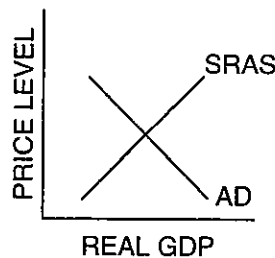
Real GDP: ↑ ↓
 Price level: ↑ ↓
 Unemployment: ↑ ↓

3. Decrease in AD



Real GDP: ↑ ↓
 Price level: ↑ ↓
 Unemployment: ↑ ↓

4. Decrease in AS



Real GDP: ↑ ↓
 Price level: ↑ ↓
 Unemployment: ↑ ↓

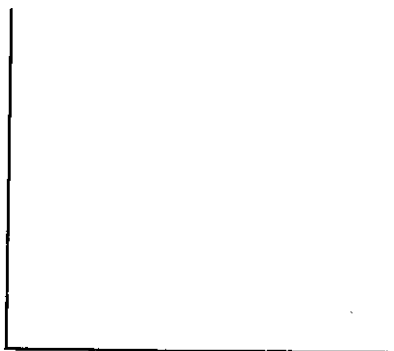
Graphing Demand and Supply Shocks

Draw an AS/AD graph to illustrate the change given in each of the questions below. On your graph be sure to label the axes (PL and Y), the AS and AD curves, and the starting and ending equilibrium PL and Y (these should be placed on the axes).

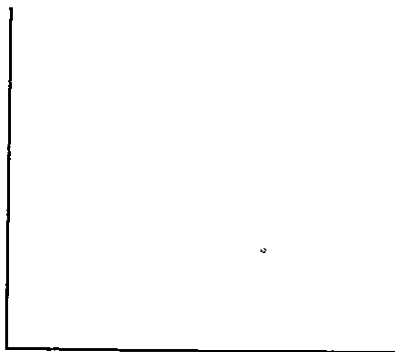
9. Economic booms in both Japan and Europe result in massive increases in orders for exported goods from the United States.



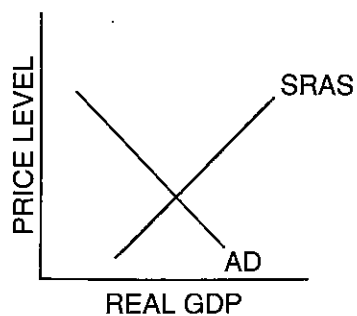
10. The government reduces taxes and increases transfer payments.



11. Fine weather results in the highest corn and wheat yields in 40 years.

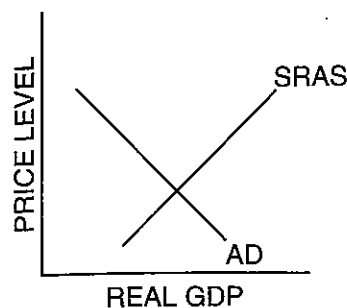


5. Production costs increase.



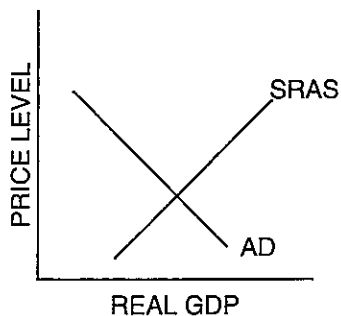
Price level: \uparrow \downarrow —
 Real GDP: \uparrow \downarrow —

6. New technology and better education increase labor productivity.



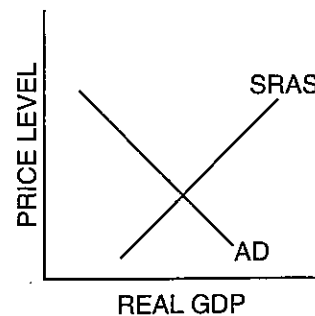
Price level: \uparrow \downarrow —
 Real GDP: \uparrow \downarrow —

7. Consumers' confidence improves.



Price level: \uparrow \downarrow —
 Real GDP: \uparrow \downarrow —

8. Net exports decrease.

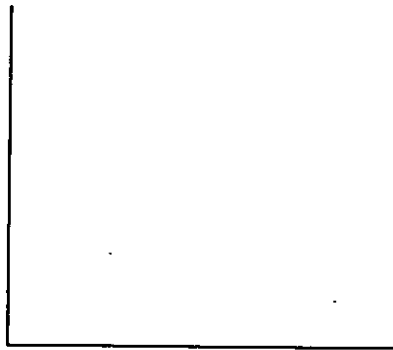


Price level: \uparrow \downarrow —
 Real GDP: \uparrow \downarrow —

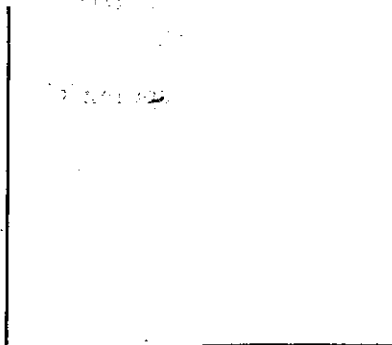
15. In response to other dramatic changes, the government raises taxes and reduces transfer payments in the hope of balancing the federal budget.



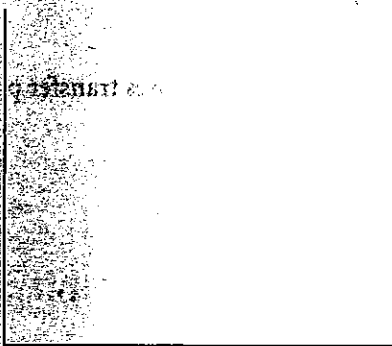
16. News of possible future layoffs frightens the public into reducing spending and increasing saving for the feared "rainy day."



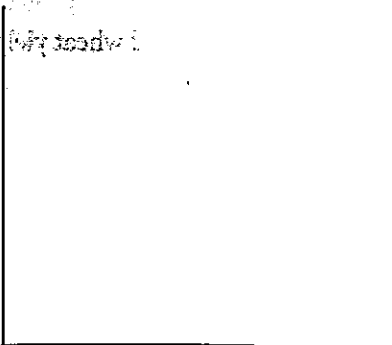
12. While the United States was in the midst of the Great Depression, a foreign power attacked, Congress declared war, and more than 1,000,000 soldiers were drafted in the first year while defense spending was increased several times over.



13. To balance the budget, the federal government cuts Social Security payments by 10 percent and federal aid to education by 20 percent.



14. During a long, slow recovery from a recession, consumers postponed major purchases. Suddenly they begin to buy cars, refrigerators, televisions, and furnaces to replace their failing models.



The Types of Inflation

The aggregate supply (AS) and aggregate demand (AD) model is used to determine changes in the price level and real gross domestic product (GDP). Changes in AS and AD lead to changes in the price level (inflation and deflation). Whether changes in the price level are due to changes in AS or AD determines the type of inflation experienced in the economy. Demand-pull inflation is caused by a shift in the AD curve. Cost-push inflation is caused by a shift in the AS curve.

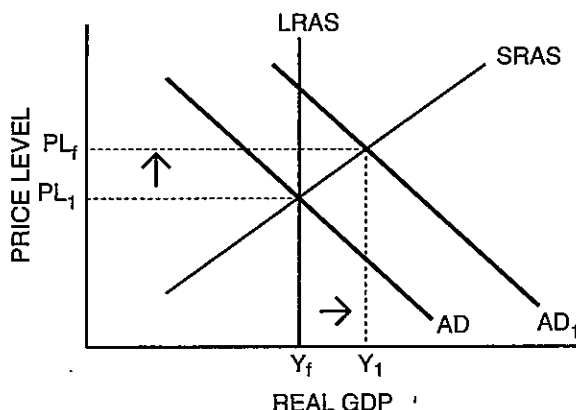
Demand-pull inflation occurs because the demand for goods and services increases at a time when the production of goods and services is already high. The increase in AD causes real GDP to expand and the price level to increase. Demand-pull inflation is often described by the saying “too much money chasing too few goods.”

Figure 3-7.1 illustrates demand-pull inflation. An increase in AD causes the AD curve to shift to the right. AD will increase as a result of a change in the determinants of AD: consumption (C), investment (I), government spending (G), and net exports (X_n). Notice that, in addition to the increase in the price level, the increase in AD leads to an increase in real GDP.



Figure 3-7.1

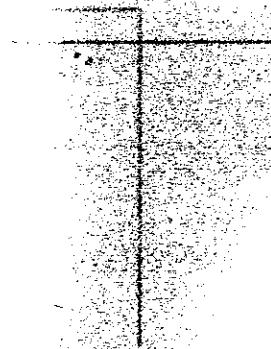
Changes in the Price Level Due to Aggregate Demand



Cost-push inflation is caused by an increase in the cost of an input with economy-wide importance. An increase in production costs throughout the economy will cause AS to decrease. For example, an increase in wages or the price of oil will increase input costs economy-wide.

Figure 3-7.2 illustrates cost-push inflation. A decrease in AS causes the AS curve to shift to the left. AS will decrease as a result of an increase in production costs throughout the economy. Notice that, in addition to the increase in the price level, the decrease in AS leads to a decrease in real GDP. *Stagflation* occurs when the economy experiences high inflation and high unemployment at the same time.

How Property from a Person



20 percent
Government
and other

3. During the election of 2100, Democratic presidential candidates all advocate the expansion of the Social Security and Medicare and Medicaid programs to include a greater number of American citizens. These campaign promises cause the United States to run a budget deficit in the year after the election, which in turn leads to increased government borrowing.

Demand-Pull Inflation *Cost-Push Inflation*

Explain:

4. The federal government raises the minimum wage to \$12 an hour.

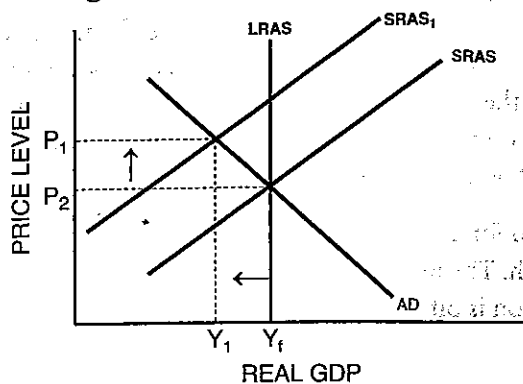
Demand-Pull Inflation *Cost-Push Inflation*

Explain:



Figure 3-7.2

Changes in the Price Level Due to Aggregate Supply



For each situation described below, circle either demand-pull or cost-push inflation and explain.

1. In his 2020 State of the Union address, President Dodge calls for an increase in the U.S. military presence across the globe to combat what he deemed a "threat to the sovereignty of the U.S. economy and trade routes."

Demand-Pull Inflation

Cost-Push Inflation

Explain:

2. The Arab Spring of 2010 disrupts oil production and supplies worldwide. This causes OPEC and commodities speculators to raise crude oil prices to record levels.

Demand-Pull Inflation

Cost-Push Inflation

Explain:

Long-Run Aggregate Supply

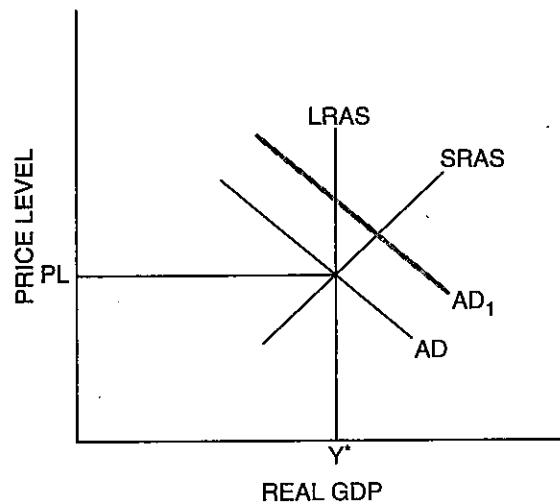
In this activity we move from the short run to the long run. In the short run, at least one factor of production is fixed. In the long run, all factors of production are variable. The short-run aggregate supply (SRAS) curve is upward sloping because of slow wage and price adjustments in the economy. But in the long run, wages and prices have time to adjust. That is, wages and prices are fully flexible. This means that any time the price level changes (i.e., there is inflation or deflation), wages and other input costs fully adjust so there is no overall effect. For example, if prices were doubled and wages and other input costs doubled, there would be no effect. Or if prices were cut in half, but so were wages and other input costs, there would be no effect. In the long run, wages and other input costs adjust so the economy always returns to the full-employment level of output. This means that the long-run aggregate supply (LRAS) curve is vertical at the full-employment output level (which is also called potential output).

Using Figure 3-8.1, answer the following questions about how the economy will react over time if the aggregate demand (AD) shifts from AD to AD_1 .



Figure 3-8.1

Increase in Aggregate Demand Starting at Full Employment



1. What will happen to output, nominal wages and real wages, and the price level in the short run? Explain.
2. What will happen to output and the price level when the economy moves to long-run equilibrium? Explain.

1944-1945

1946-1947

1948-1949

1950-1951

1952-1953

1954-1955

1956-1957

1958-1959

1960-1961

1962-1963

1964-1965

1966-1967

1968-1969

1970-1971

1972-1973

1974-1975

1976-1977

1978-1979

1980-1981

1982-1983

1984-1985

1986-1987

1988-1989

1990-1991

1992-1993

1994-1995

1996-1997

1998-1999

2000-2001

2002-2003

2004-2005

2006-2007

2008-2009

2010-2011

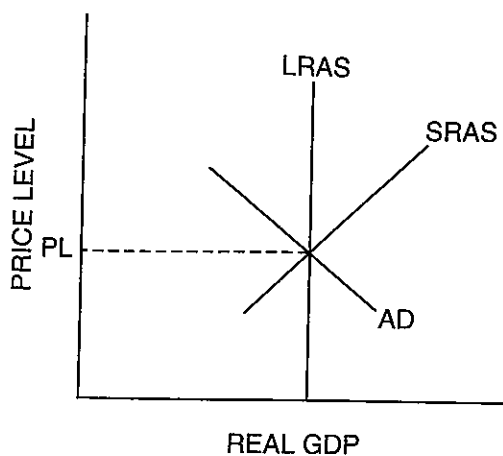
2012-2013

2014-2015

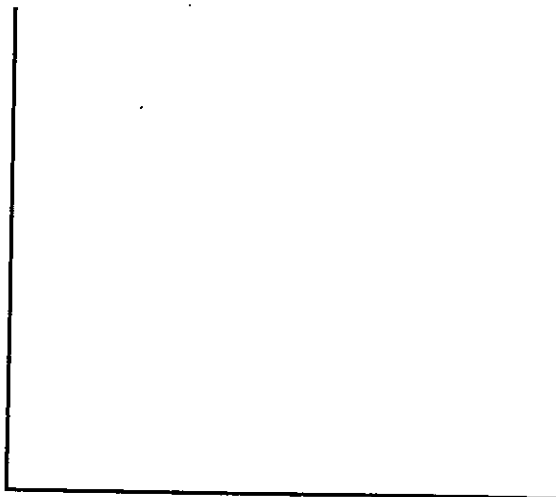
2016-2017

2018-2019

Read the description of each change in AS or AD. Draw your own graph showing the starting point as long-run equilibrium, illustrated in the graph below. Draw a new SRAS or AD curve that represents the change caused by the event described. Explain the reasons for the short-run change in the graph, and then explain what happens in the long run. Identify the final AD curve as AD_f and the final SRAS curve as $SRAS_f$.



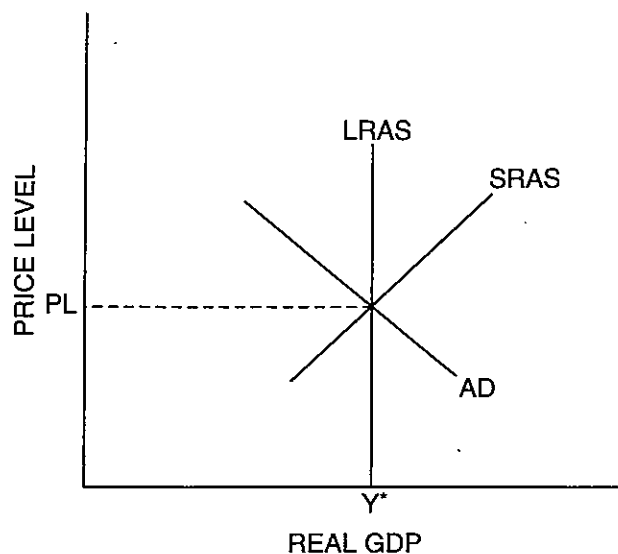
8. The government increases defense spending by 10 percent a year over a five-year period.



3. On Figure 3-8.1, draw the long-run equilibrium situation (including PL, Y, and AD).
4. Using Figure 3-8.2, answer the following questions about how the economy will react over time if the aggregate supply (AS) shifts from $SRAS$ to $SRAS_1$. Assume that no monetary or fiscal policy is undertaken.



Figure 3-8.2

Change in Short-Run Aggregate Supply

5. After $SRAS$ decreases, what happens to the short-run output, nominal wages, real wages, and the price level?
6. What will happen to output and the price level when the economy moves to long-run equilibrium? Explain.
7. On Figure 3-8.2, draw the long-run equilibrium situation (including PL, Y, and AS).

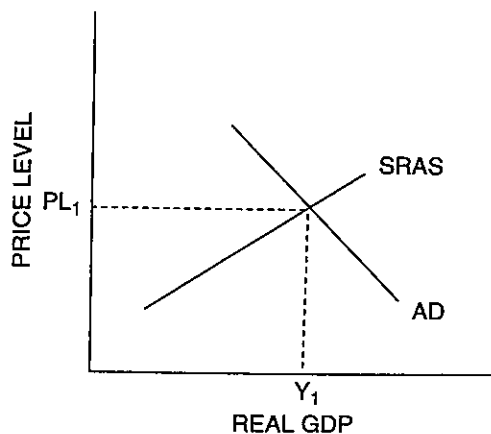
Actual versus Full-Employment Output

The model of aggregate demand (AD) and aggregate supply (AS) predicts that the macroeconomy will come to equilibrium at the intersection of a downward-sloping AD curve and an upward-sloping short-run aggregate supply (SRAS) curve. The short-run equilibrium is described as the only price level where the goods and services purchased by domestic and foreign buyers are equal to the quantity supplied within the economy. It's important to realize that, while the economy might be in equilibrium, this equilibrium level of output can be less than, equal to, or greater than full-employment output.

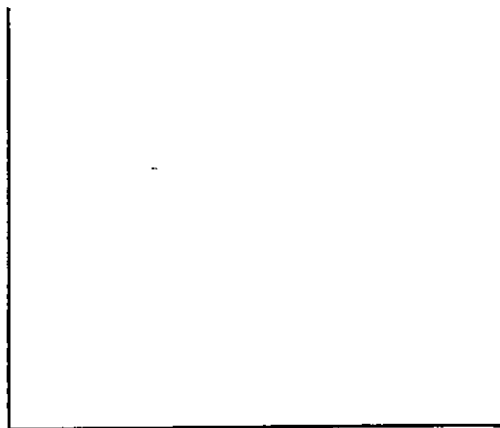
Full-employment output is the level of real gross domestic product (GDP) that exists when the economy's unemployment rate is at its natural rate. This natural rate of unemployment doesn't correspond to an unemployment rate of zero; rather, it is the unemployment rate that exists when there is no cyclical unemployment. When the economy is recessionary, the unemployment rate will exceed this natural rate. When the economy is experiencing an inflationary gap, the unemployment rate will fall below the natural rate.

The distinction between the actual unemployment rate and the natural rate allows us to reconsider the short-run equilibrium in the macroeconomy. If AD and SRAS intersect at a level of output that falls below full-employment output (at the vertical long-run aggregate supply [LRAS] curve), the economy has a recessionary gap. If the AD and SRAS curves intersect at a real output that exceeds full employment, the economy has an inflationary gap.

1. Draw an LRAS curve that illustrates a recessionary gap. Label the full-employment level of output on the graph.



9. OPEC cuts oil production by 30 percent, and the world price of oil rises by 40 percent.



10. The government increases spending on education, health care, housing, and basic services for low-income people. No increase in taxes accompanies these programs.



11. Can the government maintain output above the natural level of output with AD policy? If the government attempts to, what will be the result?



Circle the letter of each correct answer.

1. Which of the following best describes the short-run aggregate supply curve?
 - (A) The amount buyers plan to spend on output
 - (B) A curve showing the relationship between inputs and outputs
 - (C) A curve showing the trade-off between inflation and unemployment
 - (D) A curve indicating the level of real output that will be purchased at each possible price level
 - (E) A curve indicating the level of real output that will be produced at each possible price level
2. A change in which of the following will cause the aggregate demand curve to shift?
 - (A) Energy prices
 - (B) Productivity rates
 - (C) Consumer wealth
 - (D) Prices of inputs
 - (E) Prices of consumer goods
3. The short-run aggregate supply curve will shift to the right when
 - (A) energy prices increase.
 - (B) government regulation increases.
 - (C) prices of inputs decrease.
 - (D) investment spending decreases.
 - (E) productivity rates decrease.

4. A rightward shift in the aggregate demand curve will cause employment and the price level to change in which of the following ways in the short run?

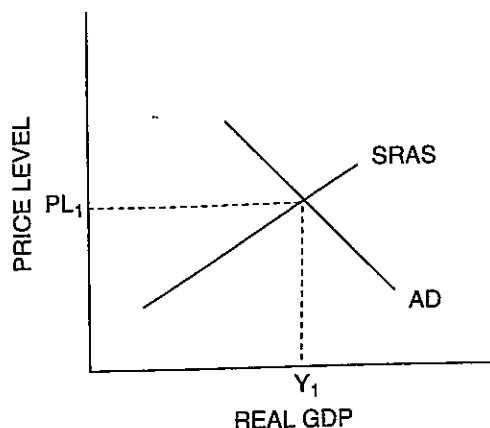
Employment	Price level
(A) Increase	Increase
(B) Increase	Decrease
(C) Increase	No change
(D) Decrease	Increase
(E) No change	No change

5. An increase in the capital stock will cause the
 - (A) aggregate demand curve to shift left.
 - (B) aggregate demand to shift right.
 - (C) production possibilities curve to shift in.
 - (D) aggregate supply curve to shift left.
 - (E) long-run aggregate supply curve to shift right.
6. Which of the following will increase aggregate demand?
 - (A) A decrease in personal income taxes
 - (B) A decrease in government spending
 - (C) An increase in corporate income taxes
 - (D) A decrease in the capital stock
 - (E) An increase in interest rate

7. An increase in labor productivity would most likely cause real gross domestic product and the price level to change in which of the following ways?

Real GDP	Price level
(A) Increase	Increase
(B) Increase	Decrease
(C) Increase	No change
(D) Decrease	Increase
(E) Decrease	No change

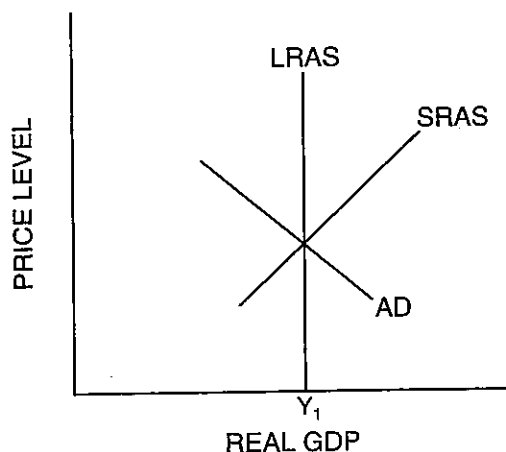
2. Draw an LRAS curve that illustrates an inflationary gap. Label the full-employment level of output on the graph.



3. Suppose households in the United States experience a decrease in wealth. Assume the economy starts at long-run equilibrium as shown in Figure 3-9.1. Use the AS/AD model to show the short-run effect on output, unemployment, and the price level.



Figure 3-9.1
Price Level



(A) Will the unemployment rate increase or decrease? Explain.

(B) What type of gap results from the decrease in wealth?

16. A sustained increase in oil prices would most likely cause short-run and long-run aggregate supply curves and the production possibilities curve to change in which of the following ways?

SRAS curve	LRAS curve	Production possibilities curve
(A) Decrease	No change	Shift outward
(B) Decrease	Decrease	Shift outward
(C) Decrease	Decrease	Shift inward
(D) Increase	No change	No change
(E) Increase	Increase	Shift inward

17. A rapid increase in successful research and development projects for the nation will most likely result in which of the following changes in the short-run and the long-run aggregate supply curves and the production possibilities curve?

SRAS curve	LRAS curve	Production possibilities curve
(A) Decrease	No change	No change
(B) Decrease	Decrease	Shift inward
(C) Increase	No change	Shift inward
(D) Increase	Increase	No change
(E) Increase	Increase	Shift outward

18. The numerical value for the spending multiplier increases as the value of the

- (A) MPS decreases.
- (B) APC increases.
- (C) MPC decreases.
- (D) MPS increases.
- (E) APC decreases.

19. If the spending multiplier is 5, the value of the tax multiplier must be

- (A) 5.
- (B) 4.
- (C) 1.
- (D) -4.
- (E) -5.

20. If the marginal propensity to consume is two-thirds, then an increase in personal income taxes of \$100 will most likely result in

- (A) a decrease in consumption of \$100.
- (B) a decrease in autonomous investment of \$100.
- (C) a decrease in consumption of \$67 and an increase in savings of \$33.
- (D) a decrease in consumption of \$67 and a decrease in savings of \$33.
- (E) an increase in government spending of more than \$100.

21. An increase in personal income taxes will most likely result in which of the following changes in real GDP and the price level in the short run?

Real GDP	Price level
(A) Decrease	Decrease
(B) Decrease	Increase
(C) Increase	No change
(D) Increase	Increase
(E) Increase	No change

22. One of the reasons the aggregate demand curve is downward sloping is that as the value of cash balances decreases, aggregate spending decreases. This is called

- (A) the interest rate effect.
- (B) the net export effect.
- (C) the Pareto effect.
- (D) the substitution effect.
- (E) the real balance effect.

8. If Maria Escalera's disposable income increases from \$600 to \$650 and her level of personal-consumption expenditures increases from \$480 to \$520, you may conclude that her marginal propensity to
- consume is 0.8.
 - consume is 0.4.
 - consume is 0.25.
 - save is 0.8.
 - save is 0.25.
9. Which effect describes the fact that when the price level increases, the interest rate increases and consumption decreases?
- Interest rate effect
 - Net export effect
 - Pareto effect
 - Substitution effect
 - Real balance effect
10. The change in real GDP that occurs when an increase in the price level leads to a change in the relative prices of imports and exports is a result of the
- interest rate effect.
 - net export effect.
 - Pareto effect.
 - substitution effect.
 - real balance effect.
11. The short-run aggregate supply curve slopes upward because of
- the wealth effect.
 - sticky wages and prices.
 - the law of diminishing returns.
 - the natural rate of unemployment.
 - the multiplier.
12. Investment demand increases as the result of
- excess productive capacity.
 - an increase in corporate business taxes.
 - businesses becoming more optimistic with respect to future business conditions.
 - recessions in foreign nations that trade with the United States, causing a lower demand for U.S. products.
 - a decrease in the real interest rate.
13. Which of the following shifts the short-run aggregate supply curve to the right?
- A technological advance
 - Rising input prices
 - Higher wages
 - An increase in government spending
 - An increase in oil prices
14. In which of the following ways will increases in short-run aggregate supply change the price level and unemployment?
- | Price level | Unemployment |
|---------------|--------------|
| (A) Increase | No change |
| (B) Decrease | Decrease |
| (C) Decrease | Increase |
| (D) Decrease | No change |
| (E) No change | Increase |
15. As the average price level decreases, the purchasing power of people's cash balances increases. This results in an increase in spending. This effect is called
- the Laffer effect.
 - the Keynesian effect.
 - the money illusion effect.
 - the real balance effect.
 - the neutrality of money.